goat or sheep NW, SE, in group SW) group detection of yearly GE upon detection with group detection with group detection of yearlings) detection d	Site Name or Description					Date	0	bserver Na	me(s)		Phone/Email		
SURVEY TIME AND WEATHER: Please review survey procedures on reverse side of this form prior to beginning survey. Observation facing north: Begin time: Power of spotting scope used: Repored of potting scope used: Sty (circle one): below 30°T; 30°T; 0.40 °T; 40 to 50 °T; 50 to 60 °T; 60 to 70 °T; 70 to 80 °T; 80 to 90 °T; over 90°T; over	Citizen Sci	ience Ho	urs (include	es driving	g, hiking + sur	vey time)- T	Time at start of	day:		1	Time at end of day:		
Observation facing north: Begin time: End time: Observation facing south: Begin time: End time: Power of binoculars used: (enter "none" if not used) Temperature (circle one): helow 30°F, 30°F to 40 °F; 40 to 50 °F; 50 to 60 °	Trail hiked Starting point					Enc	ling Point_		Number of miles				
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TOTAL NUMBER OF GOATS SHEEP SEEN DURING SURVEY PERIODS: Note if quadrant not surveyed. Report all zero sightings!	TOTAL N	NUMBE	ER OF GO	ATS SH									
GOATS: NE Quadrant: SE Quadrant: SE Quadrant: SW Quadrant:	GOATS:	NE Qu	adrant:		N	W Quadra	nt:	S	SE Quadı	rant:	SW Quadrant:		
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OTHER WILDLIFE SEEN IN EACH QUADRANT DURING 30 MINUTE SURVEY PERIODS:

Time at detection	Species	Total # animals	# adults	# young	Quadrant located (NE, NW, SE, SW)	Comments (note behavior of species and any interactions with goats observed):

OTHER MOUNTAIN GOATS OR BIGHORN SHEEP SEEN DURING HIKE (OUTSIDE OF QUADRANTS AND SURVEY PERIODS):

Time at	Goats	Total	# adults	**	#	**	Photo	UTM's	UTM's	Land-	Specific location	Comments:
detection	or	# in	if	Behavior	young	Behavior	taken	(in NAD 83)	(in NAD 83)	scape	(mountain, aspect,	
	Sheep	group	known	of adults		of young	(Y/N)	Easting	Northing	feature	trail mileage, etc.)	

MOUNTAIN GOAT AND BIGHORN SHEEP SURVEY PROCEDURES:

- 1. Navigate to survey site using route map and description, GPS point location and photo of reference point on trail.
- 2. Set up your spotting scope and face due north using a compass. Declination for our area is 14.5°E (for compasses without pre-set declination).
- 3. Hold both arms straight out at your sides to encompass a 180° view to the north. The center line of the 180° view is the boundary between NE and NW quadrants.
- 4. Survey all terrain within the 180° view while facing north for 30 minutes. Complete at least 2 full sweeps with binoculars of all terrain within the 30 minute survey period. If the view of a whole quadrant is obstructed by trees or other features do not survey that quadrant.
- 5. Count any goats/ sheep you see. Document the initial time of detection of each goat/sheep or group of goats/ sheep and location in the chart entitled "GOATS AND SHEEP DETECTED...". Do not double count goats/sheep that are moving. Be certain that you are not re-documenting the same individual or group.
- 6. Once you have completed two binocular sweeps, relocate the area(s) where goats/ sheep were seen with a spotting scope to accurately count and classify any goats/ sheep present. Spend the rest of the 30 minute survey time scanning the 180° view with a spotting scope. Photograph each group of goats or sheep seen through spotting scope.
- 7. Turn and face due south using compass. Repeat steps 2 through 6 for the SE and SW quadrants, surveying the 180° view to the south for 30 minutes.
- 8. Return survey forms and photos ASAP by fax: (406)888-7903; email: glac_citizen_science@nps.gov; or mail GNP-CCRLC, PO Box 128, West Glacier, MT 59936

Distinguishing mountain goats and bighorn sheep by age and sex

Mountain goat kids (young of year) • 1/4 adult size

- closely follow their mothers
- horns barely visible- < 3.5" (10 cm)

Yearlings • ½ adult size

• horns over 3.5" (10 cm)

Adults • Two year olds and adults are similar in size

Adult Male Goats: • Larger horn base; wider than eye width

- · Gradual horn curve
- · Stretching urination posture, external genitalia

<u>Adult Female Goats</u>: • Smaller horn base; Wider space between horns

- · Sharp horn curve (curving towards end)
- · Squatting urination posture

Bighorn sheep lambs (young of year) • 1/4 adult size

- closely follow their mothers
- horns barely visible- < 3.5" (10 cm)

Yearlings • yearling females are about ½ adult size

- yearling males are similar in size to adult females
- horns over 3.5" (10 cm)

Adults • Two year olds and adults are similar in size

Adult Male Bighorn Sheep: • Thicker horns begin to curl at two years

- · Stockier body size
- Stretching posture during urination, external genitalia

Adult Female Bighorn Sheep: • Slender, straighter horns, up to 8 to 10"

- Similar in size to yearling male
- · Squatting urination posture